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# Contents

## Classroom Articles

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**Editorial**

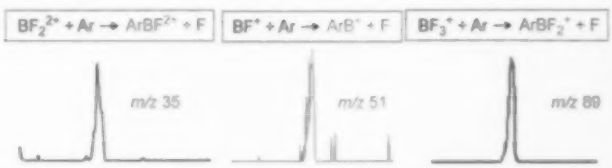
Detlef Schröder, Scott A. McLuckey, Michael T. Bowers

*2–7*

**Formation of argon–boron bonds in the reactions of $BF_n^{+/2+}$ cations with neutral argon**

Lauren Levee, Catherine Calogero, Edward Barbieri, Steven Byrne, Courtney Donahue, Michael Eisenberg, Sean Hattenbach, Julie Le, Joseph F. Capitani, Jana Roithová, Detlef Schröder

► Ion/molecule reactions of $BF_n^{+/2+}$ cations promote the formation of argon–boron bonds. ► Combined experimental and theoretical study of $Ar\text{-}BF_n^{+/2+}$ species. ► Theoretical predictions for neon–boron compounds.

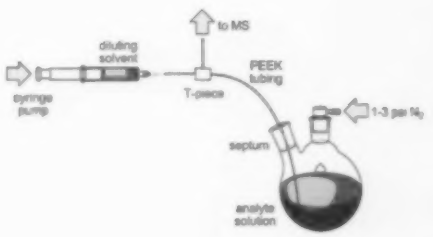



*8–13*

**Pressurized sample infusion: An easily calibrated, low volume pumping system for ESI-MS analysis of reactions**

Krista L. Vikse, Zohrab Ahmadi, Jingwei Luo, Nicole van der Wal, Kevin Daze, Nichole Taylor, J. Scott McIndoe

► Online reaction monitoring is enabled by pressurized sample infusion. ► Abundances of reactants, products and intermediates can be tracked in real time. ► Simple flow rate experiments provide an accurate estimate of internal diameter of tubing.

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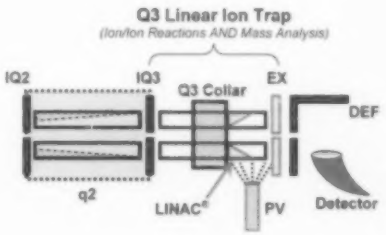
## Regular Articles


***14–20***

**Creating an evanescent ion/ion reaction region within a low-pressure linear ion trap**

J. Larry Campbell, James W. Hager

► A new environment for conducting ion/ion reactions within a linear ion trap (LIT) mass spectrometer is proposed. ► The method uses transitory application of RF and DC voltages, as well as pulsed cooling gas, to create the ion/ion reaction region. ► This "evanescent" ion/ion reaction region can be used to perform electron-transfer dissociation (ETD) with equivalent efficiency to "static" high-pressure ion/ion reaction regions.

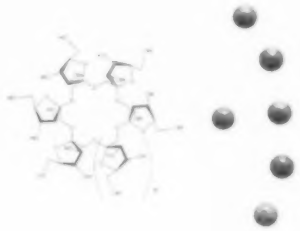



***21–27***

**Complexation of cyclofrunctans with transition metal ions studied by electrospray ionization mass spectrometry and collision-induced dissociation**

Lin Wang, Yunfeng Chai, Cuirong Sun, Daniel W. Armstrong

► An experimental approach based on ESI-MS is established to study the host–guest interactions between cyclofructans and transition metal ions. ► The transition metal ion affinities of CFs were influenced by different solvents. ► We study the gas phase selectivity of cyclofructan for transition metal cations by $CE_{50}$ method.

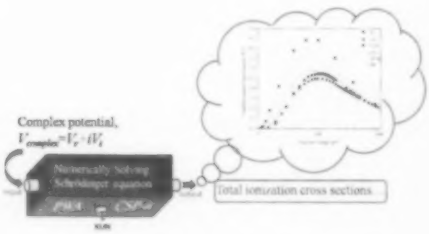


***28–33***

**Electron ionization of exotic molecular targets CN, $C_2N_2$, HCN, HNC and BF—Theoretical cross sections**

Siddharth H. Pandya, Foram A. Shelat, K.N. Joshipura, Bhushit G. Vaishnav

► Hitherto unexplored molecular targets selected, such as CN, $C_2N_2$, HCN, HNC and BF. ► Electron–molecule interaction modeled by Complex Optical Potential. ► Schrödinger equation solved numerically to obtain total cross sections. ► Ionization cross sections $Q_{ion}$ extracted from the above results. ► Applications of the present cross sections in mass spectrometry and in planetary environments.

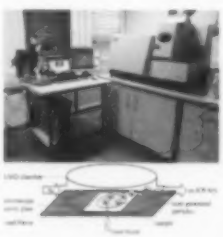



***34–40***

**Bioimaging of metals in rat brain hippocampus by laser microdissection inductively coupled plasma mass spectrometry (LMD-ICP-MS) using high-efficiency laser ablation chambers**

Bei Wu, J. Sabine Becker

► Small cylindrical laser ablation cell for novel mass spectrometric imaging technique LMD-ICP-MS was constructed and provided fast aerosol washout and efficient particle transport. ► Metal distributions in rat brain hippocampus were obtained by imaging LMD-ICP-MS with high spatial resolution using such laser ablation cell. ► Scan speed in LA-ICP-MS was found to be an important parameter that affected the sensitivity and stability of ICP-MS signals.

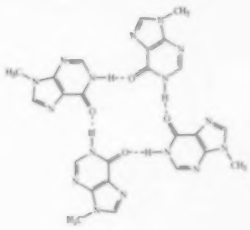


*41–44*

**Detection of 9-methylhypoxanthine tetrad by electrospray ionization mass spectrometry**

Magdalena Frańska, Małgorzata Łabędzka

► 9-Methylhypoxanthine forms magic number cluster, $[(\mathbf{MeHyp})_4 + Na]^+$ ion, detected by ESI-MS. ► Inosine and hypoxanthine do not form analogical clusters. ► Magic clusters were also detected for other than sodium alkali metal cations.

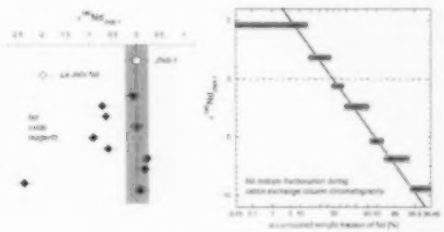


*45–54*

**Stable isotope analysis of Nd by double spike thermal ionization mass spectrometry**

Shigeyuki Wakaki, Tsuyoshi Tanaka

► High-precision Nd stable isotopic analysis is developed using the refined DS-TIMS technique. ► Typical precision of the analysis is 0.15 $\varepsilon$/amu for $\varepsilon^{146}$Nd. ► With this precision, Nd stable isotopic difference of 0.3 $\varepsilon$/amu among geological materials is resolvable. ► Ten commercial Nd oxide reagents and *La Jolla Nd* show Nd stable isotopic variations of 1.30 $\varepsilon$/amu. ► Nd isotopic fractionation during cation-exchange column chromatography is clearly demonstrated.

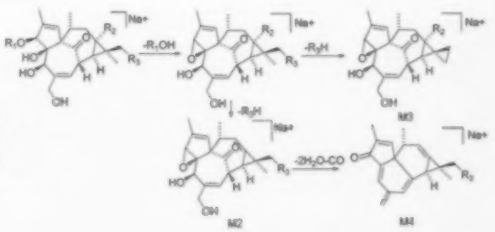


*55–62*

**Studies on the fragmentation pathways of ingenol esters isolated from *Euphorbia esula* using IT-MS$^n$ an Q-TOF-MS/MS methods in electrospray ionization mode**

Min Yang, Zhiqiang Lu, Kate Yu, Qiurong Wang, Xin Chen, Yifeng Li, Xuan Liu, Wanying Wu, De-an Guo

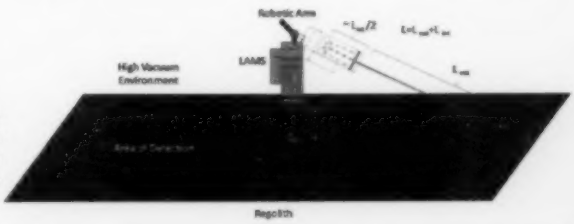
► We studied the fragmentation pathways of ingenol esters firstly. ► Seventeen standards were provided. ► Both IT-MS$^n$ and Q-TOF-MS/MS were used. ► The IT-MS$^n$ determined the elimination order of the acyloxy groups. ► The Q-TOF-MS provided high resolution mass spectra of the parent and product ions.



## Short Communication

*63–67*

**Laser ablation mass spectrometer (LAMS) as a standoff analyzer in space missions for airless bodies**

X. Li, W.B. Brinckerhoff, G.G. Managadze, D.E. Pugel, C.M. Corrigan, J.H. Doty

► Calculation has been done on a laser ablation mass spectrometer (LAMS). ► LAMS can be operated at variable drift length between 33 cm and 100 cm. ► Unit mass resolutions can be maintained by adjust-ment of internal voltages. ► LAMS is proposed as a standoff elemental composition sensor for space missions to airless bodies.